APPENDIX 10-C Stormwater Sampling Documentation

APPENDIX 10-C(1) Stormwater Sampling Work Plan



MEMORANDUM

DATE: May 28, 2010

TO: Cindy Brooks, Montana Environmental Trust Group

FROM: Mark Rhodes, Bob Anderson

SUBJECT: Proposed Scope of Work and Budget for Evaluation of Storm Water Runoff

Conditions and Discharge Options at the East Helena Facility

This memorandum presents a brief Scope of Work and preliminary budget for evaluation of storm water runoff at the East Helena Facility. As you are aware, the majority of the former plant site is currently covered with concrete, asphalt or temporary synthetic liners. As a result, infiltration capacity across the site is relatively low, and storm water runoff relatively high. The majority of site runoff is diverted to the rodeo grounds storage tank (or other on site storage facilities), and then to the HDS water treatment plant for treatment and disposal under the facility MPDES permit. Based on the extensive cleanup activities conducted over the past few years, namely the demolition of several structures and placement of temporary covers over the former structure footprints, current storm water characteristics at the site are not well defined. Based on the current site surface conditions, it is possible that a significant portion of the site runoff may be suitable for direct discharge under the facility storm water permit without treatment at the HDS plant.

Following is a proposed scope of work to assess current storm water runoff conditions at the site, in terms of runoff quantity, quality and drainage patterns, and to assess options for reducing the volume of water requiring treatment at the HDS plant. The ultimate goal of this project would be to reduce overall water treatment and O&M requirements and costs for the East Helena facility. The project is divided into four tasks as described below. A preliminary budget is included as Attachment 1.

Task 1: Characterization of Storm Water Runoff

The first step in the process is to quantify storm water runoff patterns, rates and quality across the plant site. Attached Figure 1 shows storm water drainage areas across the site as depicted in the 2006 facility SWPPP. The runoff patterns and rates will be documented during two storm water runoff events during spring 2010. Water samples will also be collected twice during spring 2010 to document runoff water quality from different portions of the site. Runoff samples will be collected at the outfall of all major drainage areas shown on Figure 1, and from sub areas within these drainage areas. Based on the runoff mapping and sampling

results, a determination will be made regarding the runoff water quality from various portions of the site, including identification of potential storm water contaminant source areas.

The first sampling event was conducted on May 24th when 17 water samples were collected. The sampling locations are shown on Figure 1 and listed in Table 1. A photolog of the sampling event is included in Attachment 2. Of the 17 samples collected, eight have been submitted to Energy Laboratories for analysis of TSS, pH and total recoverable arsenic, selenium, cadmium, copper, iron, lead and zinc. The eight samples represent main sumps or storm water collections points, with the remaining samples representing drainage to these main points. Pending analytical results from the main collection points, additional samples from 5/24 can be submitted for analyses to better delineate contaminant source areas for any collection points exhibiting elevated metals or TSS concentrations.

Task 2: Identify Contaminant Source Areas and Remedial Options:

Based on results of Task 1, and review of relevant available soils and water quality data, potential storm water contaminant source areas will be identified. Currently suspected source areas include, but are not limited to, the former onsite rail corridors and the lower ore storage area where soils are exposed. Following the source area delineation, remedial options will be evaluated and screened for effectiveness, cost and implementability. Potential remedies may include: segregation of clean and dirty runoff waters through ditching or piping; removal of contaminated surface soils, or regrading/capping of contaminated areas to prevent contact with runoff water. Capping could include placement of temporary synthetic liners, placement of soil cap, or application of soil tackifier material to reduce infiltration and erosion. It may include placement of "final" RCRA-type or evapotranspiration caps for source areas under a corrective measures study of final site cap options.

Task 3: Design of Remedial Measures

Based on the results of Task 1 and 2, design plans will be prepared for remedial actions to be taken. Design plans will include all required grading plans, cap designs, drainage features, and site revegetation or soil conditioning details. Task 3 will also address modifications requirements for the site storm water and MPDES permits to allow for direct discharge of storm water without HDS treatment, and requirements for placing any excavated soils or other contaminated materials into the Phase II CAMU cell.

Task 4: Remedial Plan Implementation

Task 4 will include implementation of the remedial design plans prepared under Task 3. Although details of any remedial plans have yet to be determined, Attachment 1 includes an estimated budget for one potential remedial scenario. The Task 4 budget is intended to provide information necessary to perform a simple cost/benefit analysis of any potential storm water runoff improvement plans as compared to the current water treatment/site O&M program.

We have intentionally kept this memo brief Cindy to provide you a summary of the proposed storm water assessment activities. We look forward to discussing this in more detail at your convenience.

APPENDIX 10-C(2) **Stormwater Sampling Notes**

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								•••••	-13 <del>-</del> 11111111111
	e Sample Code #				TD (ft)				
[*] Duplic	ate Sample Time				SWL (ft).			no acces	s pumping
	Site Cone	<u>ditions</u>		<b>■</b>	Diameter (LD *) olume (V) (gal)				
Nav. Oita.	Yes (No)	Dhoto tokon	Yes (No)		x 3=(gal.)				
New Site:		Photo taken:	-	#55555555555555555555555555555555555555	Removed (gall)				
Site Type:	DRY	surface water	process water	Pun	oing Rate (gpm)				
	monitoring v	well domestic w	ell adit seep		For S	urface Water	<u>Samples</u>		
	spring- other:	popular programme and the second		Flow Metho	od: Marsh M	lcBirney Volum	etric Flume	Weir	Estimate
Weath	er Conditions:/	calm breez	e windy	Other Flow	or Description	n:	The state of the s	~	
	TO STATE OF THE PARTY OF THE PA	no precip. rai	n snow		***************************************			The Royal Printer of the Party	
		clear /p. cloudy	overcast		and the same of th	Contract Contract Contract			***************************************
Air	Temperature:	°c	275 F	Flow:	gpm	cfs	Staff Gage:		
		A PROPERTY OF THE PROPERTY OF	Field Par	ameter Stabi	lization				
	Oxidation		11014 1 41	uncter Gtabi			Addition	al Param	eters
Time	,					T 4			
lille	Reduction	Dissolved		s.c.	Turbidity	Temperature	0	Notes	8
(military)	Potential (mV)	Dissolved Oxygen (mg/l)	pH	<b>S.C.</b> (μmhos/cm)	Turbidity (n.t.u.)	remperature (°C)	Ol	Notes	
			pН		-	-	01	Notes	
	Potential (mV)		рН		-	-	01	Notes	
	Potential (mV)		pH		-	-	01	Notes	
	Potential (mV)		pH		-	-	O.	Notes	
	Potential (mV)		pH		-	-	01	Notes	
	Potential (mV)		pH		-	-	01	Notes	
	Potential (mV)		pH		-	-	01	Notes	
	Potential (mV)				(n.t.u.)	-	pump	bailer	other
(military)	Potential (mV)	Oxygen (mg/l)		(μmhos/cm)	(n.t.u.)	(°C)			other
(military)  Turbidity:	Potential (mV) PUMP ON  clear slight	Oxygen (mg/l)		(μmhos/cm)	(n.t.u.)	(°C)			other
(military)  Turbidity:	Potential (mV) PUMP ON  clear slight	moderate very		(μmhos/cm)	(n.t.u.)	(°C)		bailer	other
(military)  Turbidity:	Potential (mV) PUMP ON  clear slight	moderate very	Sa	mple Method	(n.t.u.)  : grab o	(°C)	pump	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV)	Potential (mV) PUMP ON  clear slight  Field Po	moderate very	Sa	(μmhos/cm)  mple Method (describe)	(n.t.u.)  grab  Bottles  Filter or Unfilt.	(°C)  composite  s Collected  Preservative	pump	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l)	Potential (mV) PUMP ON  clear slight	moderate very	Sa  Quantity  1	mple Method (describe) Size 500 ml	(n.t.u.)  grab  grab  Bottle:  Filter or Unfilt.  Unfiltered  Unfiltered	composite  S Collected  Preservative  Raw  HNO ₃	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH	clear slight Field Pasample	moderate very	Sa  Quantity  1	mple Method (describe)  Size  500 ml 250 ml	(n.t.u.)  grab  grab  Bottles  Filter or Unfilt.  Unfiltered  Unfiltered  Filtered	composite  S Collected  Preservative  Raw	pump Parameter common	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (µmhos/cm)	clear slight Field Pasample	moderate very	Sa  Quantity  1	mple Method (describe)  Size  500 ml 250 ml 250 ml	(n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)	composite  S Collected  Preservative  Raw  HNO ₃	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (µmhos/cm) Turbidity (ntu)	clear slight Field Pa Sample	moderate very	Sa  Quantity  1	mple Method (describe)  Size  500 ml 250 ml	(n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)	composite  S Collected  Preservative  Raw  HNO ₃	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (µmhos/cm)	clear slight Field Pi Sample	moderate very	Sa  Quantity  1	mple Method (describe)  Size  500 ml 250 ml 250 ml mi	(n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)	composite  S Collected  Preservative  Raw  HNO ₃	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (μmhos/cm) Turbidity (ntu) H ₂ O Tmp. (°C)	clear slight Field Pa Sample	moderate very	Sa  Quantity  1	mple Method (describe)  Size  500 ml 250 ml 250 ml 250 ml ini	(n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (not.u.)  (not.u	composite  S Collected  Preservative  Raw  HNO ₃	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (µmhos/cm) Turbidity (ntu) H ₂ O Tmp. (°C) Color	clear slight Field Pi Sample	moderate very	Sa  Quantity  1	mple Method (describe)  Size  500 ml 250 ml 250 ml mi mi	(n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (n.t.u.)  (noticed)  (notic	composite  S Collected  Preservative  Raw  HNO ₃	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (µmhos/cm) Turbidity (ntu) H ₂ O Tmp. (°C) Color	clear slight Field Pi Sample	moderate very	Sa  Quantity  1 1 1	(μmhos/cm) (μμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμ	(n.t.u.)  Bottle: Filter or Unfilt. Unfiltered Filtered Filtered For UF For UF For UF For UF For UF For UF	composite  S Collected  Preservative  Raw  HNO ₃	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (μmhos/cm) Turbidity (ntu) H ₂ O Tmp. (°C) Color Odor	clear slight Field Pi Sample	moderate very arameters Duplicate	Sa  Quantity  1 1 1	(μmhos/cm) (μmhos/cm) (μmhos/cm) (μmhos/cm) (μmhos/cm) (μπhos/cm)	(n.t.u.)  Bottle: Filter or Unfilt. Unfiltered Filtered Filtered For UF For UF For UF For UF For UF For UF	composite  s Collected  Preservative  Raw  HNO ₃ HCL	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (μmhos/cm) Turbidity (ntu) H ₂ O Tmp. (°C) Color Odor	clear slight Field Pi Sample	moderate very arameters Duplicate	Sa  Quantity  1 1 1	(μmhos/cm) (μmhos/cm) (μmhos/cm) (μmhos/cm) (μmhos/cm) (μπhos/cm)	(n.t.u.)  Bottle: Filter or Unfilt. Unfiltered Filtered Filtered For UF For UF For UF For UF For UF For UF	composite  s Collected  Preservative  Raw  HNO ₃ HCL	pump Parameter common TRC Metals	bailer	***************************************
(military)  Turbidity: (circle)  ORP (mV) DO (mg/l) pH SC (µmhos/cm) Turbidity (ntu) H ₂ O Tmp. (°C) Color Odor  Comments:	clear slight Field Pi Sample	moderate very arameters Duplicate	Sa  Quantity  1 1 1	(μmhos/cm) (μmhos/cm) (μmhos/cm) (μmhos/cm) (μmhos/cm) (μπhos/cm)	(n.t.u.)  Bottle: Filter or Unfilt. Unfiltered Filtered Filtered For UF For UF For UF For UF For UF For UF	composite  s Collected  Preservative  Raw  HNO ₃ HCL	pump Parameter common TRC Metals	bailer	***************************************

P Sample Team	roject Code:  Member(s):	E. HLU C.  10072  CRYCA  Energy Labs		mont.	Sample Co	Designation: ode Number: Sample Date: sample Time:	AEH-1007- マーマー/ C	105	(military)
	,	<del></del>				undwater San			
_If D	uplicate Sam Please Reco	ple Collected, ord Below			well volume formula:	V = <u>(TD-SW</u> 25		Com	Tients
· · · · · · · · · · · · · · · · · · ·	e Sample Code #				TD (ft)			•••••	***************************************
Duplic	ate Sample Time		THE REAL PROPERTY OF THE PROPE		SWL (ff);			no acces	Spumping
maaarawaan waa ka k	Site Con	<u>ditions</u>	e major de standoccocone desse e mantanar de secondoccomo de son que de secondocco de secondocco de secondocco	B-000000000000000000000000000000000000	Diameter (LD *) olume (V) (gal) x 3=(gal.)				
New Site: Site Type:	Yes No	Photo taken: surface water	Yes No process water	<b>\$</b> 2000000000000000000000000000000000000	Removed (gal.) sing Rate (gpm)				
	monitoring	well domestic w	ell adit seep		For S	urface Water	<u>Samples</u>		
	spring- other:			Flow Metho	od: Marsh M	cBirney Volum	etric Flume	Weir	Estimate
Moath	er Conditions:	7-	e windy		or Description		Joans Hume	A AGII	eouillate
vveatite	er conditions.	no precip. rai	n snow	Other i low	or Description	"-			
Air.	Temperature:	clear p. cloudy °C	overcast	Flow:	gpm	cfs	Staff Gage:		
	erctotomocouetudendotomokanarantistasetumokald		constitution direction constitution de la constitut	ameter Stabi					
	Oxidation		<u> </u>	unneter etabli			Addition	al Param	eters
<b>Time</b> (military)	Reduction Potential (mV)	Dissolved Oxygen (mg/l)	рН	S.C. (μmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	0	r Notes	
	PUMP ON								
Turbidity:	clear)	) moderate	Sa	mple Method	grab o	composite	pump	bailer	other
(circle)	slight	very		(describe)					
	Field P	<u>arameters</u>			Bottle:	s Collected			
. 1	Sample	Duplicate	Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additio	nal Notes
ORP (mV)			1	500 ml	Unfiltered	Raw	common		
DO (mg/l)	16.60		1	250 ml	Unfiltered	HNO ₃	TRC Metals		
pH SC (μmhos/cm)	7.60		1	250 ml	Filtered	HCL	Diss Al		
SC (μπποs/cm) Turbidity (ntu)	543			mi mi	For UF				
H ₂ O Tmp. (°C)	19.04			111	For UF			••••	
Color	19.07			mi	For UF				
Odor	12-m			Hi	For UF				
Comments:				ni	Far UF				
		***************************************	······································						5:00000
				( Comments		***************************************	***************************************	***************************************	<i>ME</i>
Sample	e Team Memb	or Signatura:		<del></del>			Page		- £

APPENDIX 10-C(3)

**Stormwater Photo Log** 



PHOTO 1: CULVERT UNDER OLD HOPTOE BINS SAMPLE # EHSW-1005-100



PHOTO 3: DISCHARGE FROM BAGHOUSE LINER SAMPLE # EHSW-1005-102



PHOTO 5: WATER REPORTING TO SCALE HOUSE SUMP SAMPLE # EHSW-1005-104



PHOTO 2: ASPHALT DRAINING SAMPLE MILL AND HIGH GRADE SOIL AREA SAMPLE # EHSW-1005-101



PHOTO 4: DISCHARGE FROM BAGHOUSE SUMP SAMPLE # EHSW-1005-103



PHOTO 6: PONDED WATER ON NORTH SIDE OF SCALE HOUSE (NO DISCHARGE FROM HERE) SAMPLE # EHSW-1005-105



PHOTO 7: SINTER PLANT SUMP SAMPLE # EHSW-1005-106



PHOTO 9: NORTHERN MOST SUMP FROM DRAINGE OFF EAST SIDE OF CSHB SAMPLE # EHSW-1005-109



PHOTO 11: ORE STORAGE YARD CONCRETE RUNOFF SAMPLE # EHSW-1005-112



PHOTO 8: DISCHARGE FROM SINTER PLANT LINER SAMPLE # EHSW-1005-107



PHOTO 10: RUNOFF FROM RR TRACK SOIL ON WEST SIDE OF THAWHOUSE
SAMPLE # EHSW-1005-110 (SAMPLE # EHSW-1005-111 TAKEN DIRECTLY FROM SUMP AT BOTTOM OF CONCRETE RAMP SHOWN IN PICTURE.)



PHOTO 12: ORE STORAGE YARD SOIL RUNOFF SAMPLE # EHSW-1005-113



PHOTO 13: ORE STORAGE YARD COMBINATION OF SAMPLE 112 AN 113 SAMPLE # EHSW-1005-114



PHOTO 14: STORM WATER SUMP BY WTP SAMPLE # EHSW-1005-115